

# JAPAN

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JIS K 6302 (2011) (English): Cycles -- Tyres

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*The citizens of a nation must  
honor the laws of the land.*

Fukuzawa Yukichi

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INDUSTRIAL  
STANDARD

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(JBPI/JSA)

**Cycles — Tyres**

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## Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Bicycle Promotion Institute (JBPI)/ Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently, **JIS K 6302:2008** is replaced with this Standard, and **JIS D 9112:1991** has been withdrawn and replaced with this Standard.

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Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public or utility model right. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public or the utility model right.

# Cycles — Tyres

## Introduction

This Japanese Industrial Standard has been prepared based on the fifth edition of ISO 5775-1 published in 1997 by modifying some of the technical contents in order to reflect the actual situation in Japan.

The portions given sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JA.

## 1 Scope

This Standard specifies the pneumatic tyres for bicycles specified in JIS D 9111 (hereafter referred to as “bicycle tyres”) and pneumatic tyres for delivery bicycles (hereafter referred to as “delivery bicycle tyres”). It does not apply to tubular tyres (round tyres) or tubeless tyres.

Bicycle tyres and delivery bicycle tyres are generically referred to as “tyres”.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence is as follows.

ISO 5775-1 : 1997 *Bicycle tyres and rims — Part 1 : Tyre designations and dimensions* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and JIS are IDT (identical), MOD (modified), and NEQ (not equivalent) according to ISO/IEC Guide 21-1.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7721 *Tension/compression testing machines — Verification and calibration of the force-measuring system*

JIS D 9111 *Cycles — Classification and essential characteristics*

JIS D 9421 *Bicycles — Rims*

NOTE : Corresponding International Standard : ISO 5775-2 : 1996 *Bicycle tyres and rims — Part 2 : Rims* and Amendment 1 : 2001 (MOD)

JIS K 6250 *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

JIS K 6251 *Rubber, vulcanized or thermoplastics — Determination of tensile*



*stress-strain properties**JIS K 6259 Rubber, vulcanized or thermoplastics — Determination of ozone resistance**JIS L 1017 Test methods for chemical fibre tire cords**JIS Z 2241 Metallic materials — Tensile testing — Method of test at room temperature**JIS Z 8401 Guide to the rounding of numbers***3 Terms and definitions**

For the purpose of this Standard, the following terms and definitions apply.

**3.1 tyre size designation**

designation of the tyre size indicated as “(nominal tyre overall diameter) × (nominal tyre width)” or “(nominal tyre width) — (nominal rim diameter)”

**3.2 applicable rim**

a rim suitable for a particular tyre, capable of effectively fulfilling the tyre performance

**JIS D 9421** shall be referred to for classification, types and nominal size of applicable rims.

**3.3 design dimensions**

basic dimensions in the design of a tyre

It generically refers to the tyre overall width and tyre overall diameter (see table 1 to table 3).

**3.4 tyre overall width**

the maximum width of a tyre mounted on an applicable rim, inflated to the standard inflation pressure, and under no-load condition<sup>1)</sup> (see figure 1 to figure 4)

**NOTE :** The tyre width is defined as the linear distance between the sidewalls of the tyre excluding the moulded patterns and letters that are included in the tyre overall width.

**Note <sup>1)</sup>** In this condition, the tyre is not resting on the ground.

**3.5 tyre overall diameter**

the overall diameter of a tyre mounted on an applicable rim, inflated to the standard inflation air pressure, and under no-load condition<sup>1)</sup> (see figure 1 to figure 4)

**3.6 marked inflation pressure**

the marking of the inflation pressure given on the tyre at which the tyre performance can be effectively fulfilled

**3.7 standard inflation pressure**

the inflation pressure at which the tyre performance can be effectively fulfilled

**3.8 maximum inflation pressure**

the maximum value of inflation pressure at which the tyre performance can be effectively fulfilled

**3.9 recommended inflation pressure range**

the range of inflation pressure in which the tyre performance can be effectively fulfilled (maximum value and minimum value)

**3.10 maximum load**

the maximum load, with the tyre inflated to the standard inflation pressure, at which the endurance of the tyre can be effectively fulfilled

**3.11 PR (ply rating)**

reference rating for tyre strength, the lowest class of which is 2 PR

In the case of 2 PR, the marking may be omitted.

**3.12 delivery bicycle tyres**

BE or WO tyres with a nominal width of 1 <sup>3</sup>/<sub>4</sub> or over to and excluding 4, used for delivery bicycles moved by human power such as two-wheeled carts or monocycles

**3.13 tread**

rubber layer of the tyre to be in contact with the ground (figure 1 to figure 4)

**3.14 bead**

the part of the tyre that secures the tyre to the rim (see figure 1 to figure 4)

**3.15 sidewall**

the rubber section of the tyre between the tread and the beads (see figure 1 to figure 4)

**3.16 carcass cloth**

fibres (cords) forming a ply inside the tyre

**3.17 ply**

layer formed by cords, expressed with the number of carcass cloths

**4 Classification**

Tyres are classified according to the application and the type of bead as follows.

- a) **Classification according to application** Tyres are classified into those for bicycles and those for delivery bicycles.
- b) **Classification according to type of bead** Tyres are classified as follows according to the type of bead.
  - 1) WO <sup>2)</sup> tyres (see figure 1)
  - 2) HE <sup>3)</sup> tyres (see figure 2)
  - 3) BE <sup>4)</sup> tyres (see figure 3)

Notes <sup>2)</sup> Abbreviation for "Wired On". In the corresponding International Standard, it is defined as the "wired edge" tyre mounted on straight side rims (SS rims), or crotchet type rims (CT rims).

<sup>3)</sup> Abbreviation for "Hooked Edge". In the corresponding International Standard, it is defined as the "beaded edge" tyre mounted on hooked bead rims (HB rims).

<sup>4)</sup> Abbreviation for "Beaded Edge".

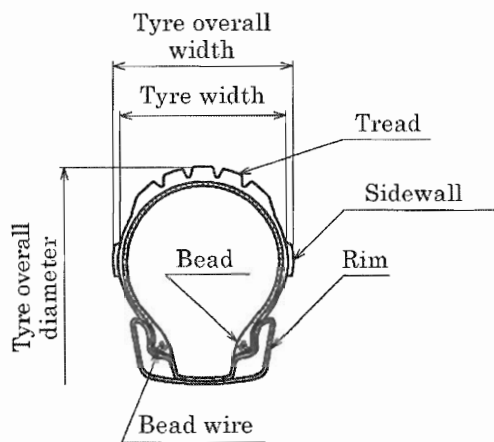


Figure 1 WO tyre

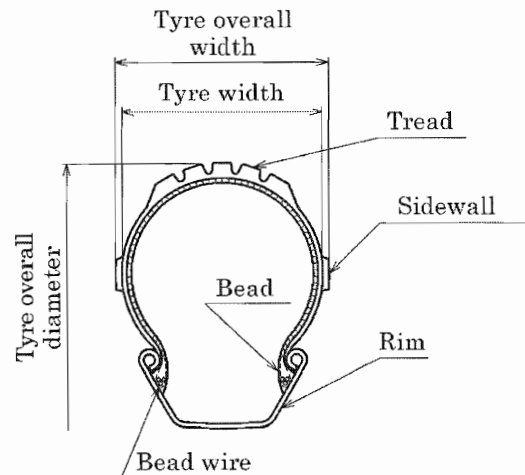


Figure 2 HE tyre

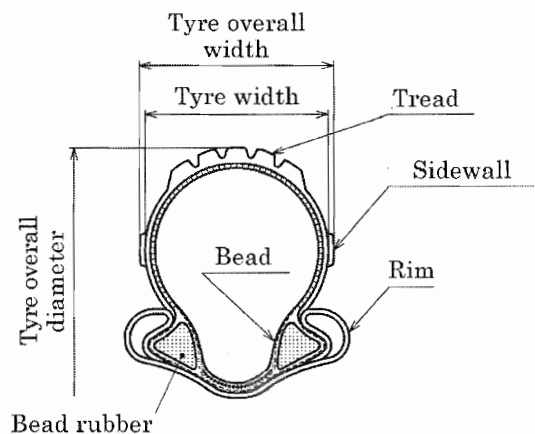


Figure 3 BE tyre

## 5 Dimensions

Tyre dimensions are classified according to the type of tyre as shown in table 1 to table 3. The classification of tyre, tyre size designation, applicable rim and standard inflation pressure other than those specified in table 1 to table 3 may be used upon agreement between the parties concerned with delivery.

Table 1 WO tyre

Tyre size designation	Applicable rim		Design dimension		Standard inflation pressure kPa	Maximum load (mass) kg
	Nominal size	Type	Tyre overall width mm	Tyre overall diameter mm		
16×1 <sup>3</sup> / <sub>8</sub> (37-349)	16×1 <sup>3</sup> / <sub>8</sub>	WO-2 or SS	37	425	300	40
		WO-3 or SS	38			
18×1 <sup>3</sup> / <sub>8</sub> (37-40)	18×1 <sup>3</sup> / <sub>8</sub>	WO-2 or SS	37	476		45
		WO-3 or SS	38			
20×1 <sup>3</sup> / <sub>8</sub> (37-451)	20×1 <sup>3</sup> / <sub>8</sub>	WO-2, 5 or SS	37	527		50
		WO-3 or SS	38			
22×1 <sup>1</sup> / <sub>4</sub> (32-501)	22×1 <sup>3</sup> / <sub>8</sub>	WO-2, 5 or SS	33	569	400	
		WO-3 or SS	34			
22×1 <sup>3</sup> / <sub>8</sub> (37-501)		WO-2, 5 or SS	37	577	300	55
		WO-3 or SS	38			
22×1 <sup>1</sup> / <sub>2</sub> (40-501)		WO-2, 5 or SS	39	581		60
		WO-3 or SS	40			
22×1 <sup>3</sup> / <sub>4</sub> (47-501)		WO-2, 5 or SS	45	593	250	80
		WO-3 or SS	46			
24×1 <sup>3</sup> / <sub>8</sub> (37-540)	24×1 <sup>3</sup> / <sub>8</sub>	WO-2, 5 or SS	37	616	300	60
		WO-3 or SS	38			
25×1 <sup>3</sup> / <sub>8</sub> (37-565)	25×1 <sup>3</sup> / <sub>8</sub>	WO-5 or SS	37	641		65
		WO-3 or SS	38			
26×1 <sup>1</sup> / <sub>4</sub> (32-597)	26×1 <sup>1</sup> / <sub>4</sub>	WO-2 or SS	33	663	400	
		WO-4 or SS	32			
26×1 <sup>3</sup> / <sub>8</sub> (37-590)	26×1 <sup>3</sup> / <sub>8</sub>	WO-2, 5 or SS	37	666	300	70
		WO-3 or SS	38			
26×1 <sup>1</sup> / <sub>2</sub> (40-584)	26×1 <sup>1</sup> / <sub>2</sub>	WO-2 or SS	39	664		
		WO-3 or SS	40			
26×1 <sup>5</sup> / <sub>8</sub> (44-584)		WO-2 or SS	42	670		
		WO-3 or SS	43			
27×1 (25-630)	27×1 <sup>1</sup> / <sub>4</sub>	WO-4, SS or CT	25	680	700	
27×1 <sup>1</sup> / <sub>8</sub> (28-630)			28	686	600	
27×1 <sup>1</sup> / <sub>4</sub> (32-630)			32	694	500	
700×25C (25-622)	700C		25	672	700	
700×28C (28-622)			28	678	600	
700×32C (32-622)			32	686	500	
27×1 <sup>3</sup> / <sub>8</sub> (37-630)	27×1 <sup>3</sup> / <sub>8</sub>	WO-2 or SS	37	704	300	
28×1 <sup>3</sup> / <sub>8</sub> (37-642)	28×1 <sup>3</sup> / <sub>8</sub>		37	716		75

NOTE 1 The tyre size designations in parentheses are those specified in the corresponding International Standard, and indicate tyre width designation-rim diameter designation.

NOTE 2 In the case of using SS rim as the applicable rim, the nominal width of the rim shall be approximate to the specified rim width of WO rim.

Table 2 HE tyre

Tyre size designation	Applicable rim		Design dimensions		Standard inflation pressure kPa	Maximum load (mass) kg
	Nominal size	Type	Tyre overall width mm	Tyre overall diameter mm		
12.5×2.25 or 12½×2¼	12½×2¼	HE-1 or HB	57	320	250	40
14×1.50	14×1.75		40	340		
	14×1.50	HE-5 or HB	38			
14×1.75	14×1.75	HE-1 or HB	45	349		45
	14×1.50	HE-5 or HB	43			
16×1.50	16×1.75	HE-1 or HB	40	391		
	16×1.50	HE-5 or HB	38			
16×1.75	16×1.75	HE-1 or HB	45	400		50
	16×1.50	HE-5 or HB	43			
18×1.50	18×1.75	HE-1 or HB	40	441		55
	18×1.50	HE-5 or HB	38			
18×1.75	18×1.75	HE-1 or HB	45	450		60
	18×1.50	HE-5 or HB	43			
20×1.50	20×1.75	HE-1 or HB	40	492		
	20×1.50	HE-5 or HB	38			
20×1.75	20×1.75	HE-1 or HB	45	501		65
	20×1.50	HE-5 or HB	43			
20×2.125	20×1.75	HE-1 or HB	54	517		70
22×1.75	22×1.75		45	552		
	22×1.50	HE-5 or HB	43			
24×1.50	24×1.75	HE-1 or HB	40	594		75
24×1.75			45	603		80
26×1.50	26×1.75		40	645		
26×1.75			45	654		85
26×2.125			54	674		90

NOTE : In the case of using HB rim as the applicable rim, the nominal width of the rim shall be equal to or approximate to the specified rim width of HE rim.

Table 3 BE tyre

Tyre size designation	Applicable rim		Design dimensions		Standard inflation pressure kPa	Maximum load (mass) kg
	Nominal size	Classification or type	Tyre overall width mm	Tyre overall diameter mm		
26×1⅜	26×1⅜	BE-1	39	668	300	70
26×1¾	26×1¾		46	685		100
26×1¾ 4PR						110
26×2	26×2	BE	52	698		130
26×2 4PR					350	150
26×2½	26×2½	BE	70	700	300	180
26×2½ 4PR					350	210
26×3 4PR	26×3		80	687	300	250

## 6 Tyre dimensions

### 6.1 Tyre overall width

The tyre overall width in service shall be measured according to 6.3, and the measured width shall not be greater by 3 mm than the tyre overall width specified in the design dimension in table 1 to table 3.

### 6.2 Tyre overall diameter

The tyre overall diameter in service shall be measured according to 6.3, and the measured diameter shall not be greater by 6 mm than the tyre overall diameter specified in the design dimension in table 1 to table 3.

### 6.3 Measurement of tyre dimensions in service

The tyre shall be mounted on the applicable rim given in table 1 to table 3, inflated to the marked inflation pressure and allowed to stand for a minimum of 24 h, after which the inflation pressure shall be readjusted to the original value and the measurement shall be performed on the tyre under no-load condition. If the marked inflation pressure is a range, the maximum value shall be used.

The tyre overall diameter shall be either measured using vernier callipers, or obtained by measuring the outer periphery of the tyre with a steel tape measure and dividing the measured value by  $\pi$  ( $= 3.14$ ). The tyre overall width shall be measured with vernier calipers (see figure 1 to figure 4).

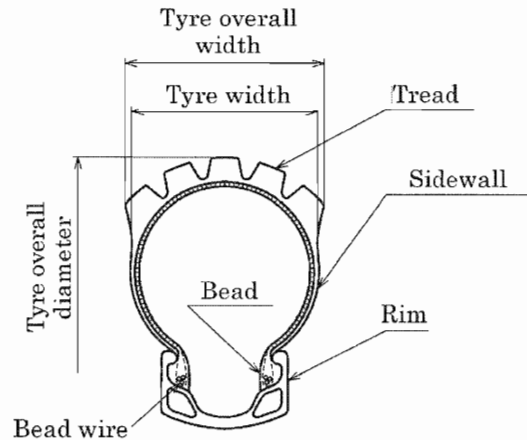


Figure 4 Example of tyre dimension measurement (HE tyre)

## 7 Quality

### 7.1 Appearance

Tyres shall be uniform in shape and thickness, and free from scratches, bubbles, rubber cracks, inferior rubber flow and harmful defects due to foreign matter inclusion, and shall be free from visible distortion when mounted on a rim recommended in table 1 to table 3 or any rim agreed upon between the parties concerned with delivery.

## 7.2 Performance

The performance of tyres, which is divided into that of bicycle tyres and that of delivery bicycle tyres, when tested by clause 8, shall conform to the requirements in table 4 or table 5.

**Table 4 Performance of bicycle tyres**

Item	Test	Performance		Test sub-clause	
Tensile strength of tread rubber	Tread rubber tensile test	8.0 MPa min.		8.1	
Elongation of tread rubber		350 % min.			
Bending resistance of bead rubber <sup>a)</sup>	Bead rubber bending test	The bead rubber shall not break.		8.2	
Tensile strength of bead wire <sup>b)</sup>	Bead wire tensile test	3.2 kN min.		8.3	
Tensile strength of carcass cloth	Carcass cloth tensile test	40.0 N/mm min.		8.4	
Cohesive strength	Peeling test	Rubber to cloth	2.0 N/mm min.	8.5	
		Cloth to cloth	2.0 N/mm min.		
Breaking energy	Plunger test	7.0 J min.		8.6	
Rim running-off resistance <sup>b)</sup>	Water pressure test	Tyre size designation	Width < 1 <sup>3</sup> / <sub>8</sub> (or 1.37)	800 kPa min.	8.7
			Width ≥ 1 <sup>3</sup> / <sub>8</sub> (or 1.37)	600 kPa min.	
			Width < 1 <sup>3</sup> / <sub>4</sub> (or 1.75)		
			Width ≥ 1 <sup>3</sup> / <sub>4</sub> (or 1.75)	500 kPa min.	
Running durability <sup>c)</sup>	Running durability test	Tyre size designation	Dia. ≤ 18	2 000 km	8.8
			20 ≤ Dia. ≤ 25	3 000 km	
			Dia. ≥ 26 and Width < 1 <sup>3</sup> / <sub>8</sub> (or 1.37)		
			Dia. ≥ 26	5 000 km	
			Width ≥ 1 <sup>3</sup> / <sub>8</sub> (or 1.37)		
Ozone cracking resistance of sidewall rubber	Sidewall rubber ozonizing test	To be within C — 2 in cracking state specified in JIS K 6259.		8.9	
Notes <sup>a)</sup> To be applied to BE tyres. <sup>b)</sup> To be applied to WO and HE tyres. <sup>c)</sup> When subjected to a running test to attain the distance specified by the respective tyre designations, there shall not be rim running-off during the test, and neither visible cloth breakage, ply separation nor tread rubber cracking reaching the cloth layer shall be observed after the test.					

**Table 5 Performance of delivery bicycle tyres**

Item	Test	Performance					Test sub-clause
Tensile strength of tread rubber	Tread rubber tensile test	8.0 MPa min.					8.1
Elongation of tread rubber		300 % min.					
Bending resistance of bead rubber <sup>a)</sup>	Bead rubber bending test	The bead rubber shall not break.					8.2
Tensile strength of bead wire <sup>b)</sup>	Bead wire tensile test	3.2 kN min.					8.3
Tensile strength of carcass cloth	Carcass cloth tensile test	Tyre size designation	Width ≥ 1 <sup>3</sup> / <sub>4</sub> (or 1.75)	2 PR	50.0 N/mm min.	8.4	
			Width < 2 <sup>1</sup> / <sub>2</sub> (or 2.50)	4 PR	32.0 N/mm min.		
			Width ≥ 2 <sup>1</sup> / <sub>2</sub> (or 2.50)	2 PR	50.0 N/mm min.		
				4 PR	40.0 N/mm min.		
				6 PR	32.0 N/mm min.		
Cohesive strength	Peeling test	Rubber to cloth	2.0 N/mm min.			8.5	
		Cloth to cloth	3.0 N/mm min.				
Breaking energy	Plunger test	Tyre size designation	Width ≥ 1 <sup>3</sup> / <sub>4</sub> (or 1.75)	2 PR	10.0 J min.	8.6	
			Width < 2 <sup>1</sup> / <sub>2</sub> (or 2.50)	4 PR	12.0 J min.		
			Width ≥ 2 <sup>1</sup> / <sub>2</sub> (or 2.50)	2 PR	10.0 J min.		
				4 PR	16.0 J min.		
				6 PR	20.0 J min.		
Notes <sup>a)</sup> To be applied to BE tyres. <sup>b)</sup> To be applied to WO tyres.							

## 8 Test method

### 8.1 Tread rubber tensile test

Measure the tensile strength and the elongation at break through testing by the methods given in JIS K 6251 and using a test piece of No.3 dumbbell shape. The test piece shall be taken, in the circumferential direction of the tyre, from the ground contact part of the tread rubber which has been peeled off from the sample tyre.

### 8.2 Bead rubber bending test

Peel off carefully about 100 mm length of bead rubber from the sample tyre and use it as the test piece. Place a round bar of 10 mm diameter on the test piece at right angles to the longitudinal direction of the test piece, and bend the test piece around the round bar at the mid-point of its bottom face adjacent to the carcass gradually to an angle of 90°, and hold it at this angle for 1 min. See if any fracture occurs in the test piece. The standard temperature and the standard humidity of the laboratory shall be in accordance with 6.1 and 6.2 of JIS K 6250, respectively.

### 8.3 Bead wire tensile test

The bead wire tensile test shall be as follows.



- a) **In the case of hard drawn steel wire** If the sample is a single wire, take a bead wire of about 200 mm length so as to include the joint, such that the joint is at the mid-point of the test piece. Perform the tensile test specified in JIS Z 2241 using this test piece, and express the measured value of tensile strength in kN. If the sample consists of two or more wires, use one of the wires by avoiding the part where the wires are overlapped, and multiply the result by the number of wires. For the test result, round the mean of the measured values of the two test pieces to one decimal place according to the rounding method in JIS Z 8401.
- b) **In the case of aramid fibre** Perform the test method specified in 8.5 a) of JIS L 1017, and express the measured value of tensile strength in kN. For the test result, round the measured value to one decimal place according to the rounding method in JIS Z 8401.

#### 8.4 Carcass cloth tensile test

Take a cloth layer of 10 mm width (measure the innermost layer from a lower point of the tread central part in the case of cord fabrics) from the carcass cloth in the direction of warp if it is cord fabric, and in both directions of warp and weft if plain weave fabric, to prepare the test piece. Measure the tensile strength of the carcass cloth by Class 1 or better tensile tester specified in JIS B 7721 according to the method in a) or b), in the case of cord fabrics, and according to the method b), in the case of plain weave fabric. The tensile speed shall be 200 mm to 300 mm per min, and the free length of test piece between grips shall be at least 20 mm. The standard temperature and standard humidity of the laboratory shall be in accordance with 6.1 and 6.2 of JIS K 6250 respectively.

- a) **Method A** Measure the maximum tensile force when all cords of 10 mm width test piece break simultaneously, and calculate the tensile strength by the following formula. For test result, round the mean of the values obtained from three test pieces to one decimal place according to the rounding method specified in JIS Z 8401.

$$L = \frac{S}{b} \times \frac{P}{PR}$$

where,       $L$  : tensile strength (N/mm)  
                   $S$  : measured tensile force value (N)  
                   $b$  : width of test piece (mm)  
                   $P$  : actual number of plies  
                   $PR$  : ply rating

- b) **Method B** Measure the maximum tensile force of each cord of 10 mm width sample, and take the sum total  $S'$  to calculate the tensile strength by the following formula. For the test result, calculate the mean of measured values of three test pieces, in the case of cord fabric, and the mean of measured values of warp and weft, in the case of plain weave fabric, and round the result to one decimal place according to the rounding method specified in JIS Z 8401.

$$L' = \frac{S'}{b} \times \frac{P}{PR}$$

where,  $L'$  : tensile strength (N/mm)  
 $S'$  : sum total value of tensile force of each cord (N)  
 $b$  : width of test piece (mm)  
 $P$  : actual number of plies  
 $PR$  : ply rating

## 8.5 Peeling test

### 8.5.1 Cohesive strength between rubber and cloth

The cohesive strength between rubber and cloth shall be as follows.

- a) If the carcass cloth is cord fabrics, take a piece of about 15 mm from the sample in the direction parallel to the warp of cloth layer adjacent to the tread rubber, and cut off the bead part at one end. Then, peel off a small part of the cloth layer adjacent to the tread rubber from the tread rubber, and leaving the cloth layer of 10 mm width measured across the warp, pull out the disuse cords on both sides to prepare the test piece. In this case, all other cloth layers shall be attached to the cloth layer adjacent to the tread rubber.

If the sample carcass cloth is plain weave fabrics, prepare the test pieces, similarly to the case of cord fabrics, in both directions of warp and weft.

- b) Scrape off the patterned ribs of the tread rubber until approximate flatness is obtained, clamp the tread rubber side in the upper grip of a peeling tester and perform peeling at a rate of 25 mm/min  $\pm$  2.5 mm/min to obtain the curve of tensile force required for peeling drawn by an autographic recorder. Calculate the mean value of each peak (higher side of numerical value) of waveform in this curve and record it as the cohesive strength.
- c) The cohesive strength shall be expressed in N/mm, and the test result shall be represented by each mean value of the measured values of three test pieces for cord fabrics and of two test pieces (one along warp and one along weft) for plain weave fabrics, which is rounded to one decimal place according to the rounding method specified in JIS Z 8401.
- d) The standard temperature and the standard humidity of the laboratory shall be in accordance with 6.1 and 6.2 of JIS K 6250, respectively.

### 8.5.2 Cohesive strength between cloth and cloth

Cut out a test piece of about 20 mm width from the sample in parallel to the warp of the cord fabric first layer, and peel off, from one of its ends, a part of the cord fabric first layer of 10 mm width while leaving both sides, and pull out each cord adjacent to both sides. Then, after scraping the tread patterns until approximate flatness is obtained, carry out the test by the same method as described in 8.5.1.

When peeling off, the cord fabric first layer shall retain as little rubber as possible.

### 8.6 Plunger test

Put a rubber tube of the corresponding nominal size into the sample tyre, mount it on a rim recommended for the tyre, and inflate the tube with a pneumatic pressure of  $350 \text{ kPa} \pm 10 \text{ kPa}$ .

The test apparatus shall be capable of pressing a plunger of  $8.0 \text{ mm} \pm 0.1 \text{ mm}$  diameter with a semispherical end, onto the tyre at a rate of  $50 \text{ mm} \pm 2.5 \text{ mm per min}$ .

For the measurement, press the plunger, perpendicularly to the tyre axis, onto a protrusive part of the tread pattern as near the centre of the tyre as possible, at a rate of  $50 \text{ mm} \pm 2.5 \text{ mm per min}$ . Measure the pressing forces and plunger travels at the respective positions quartering the tyre periphery just before the tyre breaking. Where the plunger reaches the rim without the tyre bursting, record the value just before it reaches the rim.

Calculate the breaking energy at each measuring position by the following formula.

$$W = \frac{F \times P}{2}$$

where,  $W$  : breaking energy (J)

$F$  : pressing force at tyre breaking (N)

$P$  : plunger travel (m)

The breaking energy of the tyre shall be the mean of the values of the breaking energy  $W$  calculated by the above formula from two of the four measured values obtained at four positions, excluding the maximum and minimum values. The results shall be rounded to one decimal place according to the rounding method specified in JIS Z 8401.

### 8.7 Water pressure test for rim running off resistance

#### 8.7.1 Test apparatus

For the test apparatus, a water pressure testing manual pump or an equivalent, which uses a pressure proof hose or a pipe with a minimum inner diameter of 3 mm as the conduit to connect to a tyre rubber tube. The length of the conduit shall be 2 m or less.

The testing rim shall be that specified in JIS D 9421 and shall be symmetrical. Those other than specified in JIS D 9421 may be used upon agreement between the parties concerned with delivery.

#### 8.7.2 Test method

Mount the specimen tyre on an appropriate rim as described above, and connect to the water pressure testing pump through the conduit. After deflating the tube, re-inflate to apply inner pressure gradually to adjust to position the bead in the correct state, and increase again the inner pressure gradually. The inner pressure shall be applied gradually by attaining the standard inflation pressure specified in table 1 to table 3, thereafter raised at a rate of  $100 \text{ kPa} \pm 10 \text{ kPa per min}$ . Read the pressure when the bead runs off from the rim at any place, and take the value as the rim running-off pressure. The indicator shall be read at the time of the pointer stabilizing, and the measuring unit shall be 100 kPa.

## 8.8 Running durability test

### 8.8.1 Test apparatus

The test apparatus shall be constructed so as to press the tyre on a drum surface perpendicularly toward its centre to interlock the tyre with the drum rotation. The drum shall be made of iron with a smooth surface, and shall have the outer diameter of  $760 \text{ mm} \pm 10 \text{ mm}$  and the width not less than twice the nominal width of specimen tyre. The drum shall be attached with two shock bars of a length equal to the drum width on the surface at even intervals along the periphery and in parallel with the drum axis.

The sectional shape of the shock bar shall be a rectangle of  $10 \text{ mm} \pm 0.1 \text{ mm}$  width and  $5 \text{ mm} \pm 0.1 \text{ mm}$  height with each curvature radius of  $1.0 \text{ mm} \pm 0.05 \text{ mm}$  on the corners.

### 8.8.2 Test method

Putting a rubber tube of the corresponding designation into the sample tyre, and mount them on a recommended rim. Apply the standard inflation pressure specified in table 1 to table 3 in the tube. Then, press the tyre vertically on the drum face with the maximum load specified in table 1 to table 3, and rotate the tyre through the drum rotating. Set the drum rotating speed at a rate  $40 \text{ km/h} \pm 4 \text{ km/h}$  to perform the running test until the running distance on the drum surface attains the running endurance distance by the tyre designation given in table 4, and examine the tyre condition.

The room temperature of laboratory, measured at a position apart 1 m or more from the specimen, shall be  $25 \text{ }^{\circ}\text{C} \pm 10 \text{ }^{\circ}\text{C}$ .

## 8.9 Sidewall rubber ozoning test

### 8.9.1 Sampling and preparation of test piece

The sampling and preparation of test piece shall be as follows.

- a) Cut the tyre into  $60 \text{ mm}$  length  $\times$   $55 \text{ mm}$  width, and take it as the test piece.
- b) After heat-treating the test piece in a thermostat at a temperature of  $60 \text{ }^{\circ}\text{C} \pm 2 \text{ }^{\circ}\text{C}$  for 1 h, wind it around a round bar ( $\phi 15 \text{ mm}$ ) to make it a flat strip.

### 8.9.2 Test method

The test method shall be in accordance with **JIS K 6259**. In this case, the ozone concentration shall be  $250 \text{ ppb} \pm 50 \text{ ppb}$ , and the testing time shall be 16 h. The part within 5 mm of the tyre tightening part shall not be evaluated.

## 9 Designation of products

Products shall be designated by the number of this Standard, "bicycle tyre" (name) or "delivery bicycle tyre" (name) and tyre size designation.

Example 1   **JIS K 6302**    $26 \times 1\frac{3}{8}$

Example 2   Bicycle tyre    $20 \times 1.50$

Example 3   Delivery bicycle tyre    $26 \times 2$

## 10 Marking

The tyres shall be marked indelibly with the following information.

- a) Tyre size designation
- b) Standard inflation pressure, maximum inflation pressure or recommended inflation pressure range
  - Example 1 Standard inflation pressure 300 kPa
  - Example 2 Maximum inflation pressure 350 kPa
  - Example 3 Recommended inflation pressure range 250 kPa to 350 kPa
- c) Manufacturer's name or its abbreviation
- d) Number or symbol of manufacture

**Annex JA (informative)**  
**Comparison table between JIS and corresponding International Standard**

<b>JIS K 6302 : 2011 Cycles — Tyres</b>					<b>ISO 5775-1 : 1997 Bicycle tyres and rims — Part 1 : Tyre designations and dimensions</b>		
(I) Requirements in <b>JIS</b>		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between <b>JIS</b> and the International Standard by clause		(V) Justification for the technical deviation and future measures
No. and title of clause	Content		No. of clause	Content	Classification by clause	Detail of technical deviation	
1 Scope	This Standard specifies the pneumatic tyres for bicycles specified in <b>JIS D 9111</b> and pneumatic tyres for delivery bicycles. It does not apply to tubular tyres (round tyres) or tubeless tyres.		1	This International Standard specifies the wired edge tyres mounted on SS and C rims, and beaded edge tyres mounted on HB rims. Tubular sew-up tyres and non-pneumatic tyres are not covered.	Addition	Delivery bicycle tyres are not covered by the <b>ISO</b> standard. <b>JIS</b> specifies delivery bicycle tyres of nominal tyre width 1 3/4 or over.	The delivery bicycle tyres are added to <b>JIS</b> to suit the situations in Japan. Possibility of submitting a revision proposal to <b>ISO</b> will be discussed.

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
No. and title of clause	Content		No. of clause	Content	Classification by clause	Detail of technical deviation	
3 Terms and definitions 3.1 tyre size designation	designation of the tyre size indicated as “(nominal tyre overall diameter) × (nominal tyre width)” or (nominal tyre width) – (nominal rim diameter)		4.1	Tyres for SS rims and C rims : (nominal section width mm) – (nominal rim diameter), beaded edge tyres mounted on HB rims : (outside diameter code) × (nominal section width code)	Alteration	Some JISs specify tyres that are designated by inch sizes of tyre overall diameter and tyre width. In Japan, designation by inch sizes is still used to express the sizes of bicycle or some types of tyres. Should all these designations be replaced with the millimetre designation of ISO, there will be confusion in the market concerning the correlation with nominal rim size. Therefore, the conventional designations of JIS are carried over, and are indicated together with ISO designations. In ISO, addition of old marking(s) in parentheses before or after the tyre size designation is permitted in consideration of the customers in those countries where other systems of marking are used.	Two tyre designations are indicated in parallel to suit the situations in Japan. Possibility of submitting a revision proposal to ISO will be discussed.
			4.1.2	The old marking(s), used in Japan, may be added in parentheses.			

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
No. and title of clause	Content		No. of clause	Content	Classification by clause	Detail of technical deviation	
3.2 to 3.17	Definitions of terms. Reference to <b>JIS D 9421</b> for details of applicable rims is given.		—		Addition	In <b>JIS</b> , definitions of terms that are used in this Standard are added.	Clear definitions of terms are given. No substantial deviation
4 Classification	Tyres are classified into those for bicycles and those for delivery bicycles, and further into three types according to the type of bead.		1	Tyres are classified into two types according to the applicable rim.	Addition	The bead type BE is added in <b>JIS</b> since BE tyres for heavy goods delivery bicycles are circulated in Japanese market.	BE tyres are added to <b>JIS</b> based on the current circulation in the Japanese market. Possibility of submitting a revision proposal to <b>ISO</b> will be discussed.
5 Dimensions	Dimensions are specified for each type of tyre, in table 1 to table 3.		4.2.3 5.2.4	Dimensions are specified for each type of tyre.	Addition	In <b>JIS</b> , applicable rims for respective tyre designations are shown, together with specifications of tyre overall width and overall diameter, whereas in the <b>ISO</b> , the measuring rim width, tyre section width and section height are specified for respective nominal section widths.	BE tyres are added to <b>JIS</b> based on the current circulation in Japan. Possibility of submitting a revision proposal to <b>ISO</b> will be discussed.



(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
No. and title of clause	Content		No. of clause	Content	Classification by clause	Detail of technical deviation	
5 (concluded)						The format of the table is changed from that of the ISO, but in this revision, the specifications of WO and HE tyre width and overall diameter are aligned with ISO, and for the specification of BE tyres which are not given in the ISO, conventional values from the previous edition of this JIS are adopted.	
6 Tyre dimensions 6.1 Tyre overall width 6.2 Tyre overall diameter	The measured tyre overall width shall not be greater by 3 mm than the specified value. The measured tyre overall diameter shall not be greater by 6 mm than the specified value.		4.2	The maximum width in service and the maximum overall diameter in service are specified.	Alteration	In ISO, the calculation methods for obtaining the maximum width in service and maximum overall diameter in service are shown.	No substantial deviation.

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
No. and title of clause	Content		No. of clause	Content	Classification by clause	Detail of technical deviation	
6.3 Measurement of tyre dimensions in service	In addition to the measurement method of ISO, the instruments for measuring the overall diameter and overall width are specifically given.		4.4 5.3	Tyres shall be mounted on applicable rims, inflated to the recommended inflation pressure and allowed to stand for 24 h, after which the inflation pressure shall be readjusted to the original value and measurement shall be performed.	Addition	In JIS, the instruments that can be used for measurement are shown for preventing possible confusions in actual measurements.	Measuring instruments are specifically given, and this causes no substantial deviation.
7 Quality 7.1 Appearance	The appearance of tyre is specified.		—	—	Addition	In JIS, quality requirements and their test methods are specified for implementation of the JIS marking system.	Possibility of submitting a revision proposal to ISO will be discussed.
7.2 Performance	Performance of tyres is separately specified for bicycle tyres and delivery bicycle tyres.		—	—	Addition	In JIS, quality requirements and their test methods are specified for implementation of the JIS marking system.	Possibility of submitting a revision proposal to ISO will be discussed.
8 Test method			—	—	Addition	In JIS, quality requirements and their test methods are specified for implementation of the JIS marking system.	Possibility of submitting a revision proposal to ISO will be discussed.

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
No. and title of clause	Content		No. of clause	Content	Classification by clause	Detail of technical deviation	
9 Designation of products	Designation of tyres is specified.		—	—	Addition	In JIS, the designations are specified for smooth business tradings.	Possibility of submitting a revision proposal to ISO will be discussed.
10 Marking	Markings of tyre size designation, standard inflation pressure or maximum inflation pressure or recommended inflation pressure range, name of manufacturer and number of manufacture.		4.1  4.1.3	Tyre designation shall be shown on the sidewall of the tyre.  Preferred direction of rotation of tyre indicated with an arrow, markings of recommended inflation pressure or maximum inflation pressure, and other characteristics.	Addition	In JIS, markings of manufacturer's name and number of manufacture are added. JIS adds marking items for ensuring the benefit of users'.	Possibility of submitting a revision proposal to ISO will be discussed.
—	—		Annex A	Old marking	Deletion	In JIS, this content is contained in table 1 and table 2. Therefore this Annex A is deleted.	No substantial alteration.

Overall degree of correspondence between **JIS** and International Standard (ISO 5775-1 : 1997): MOD

- NOTE 1 Symbols in sub-columns of classification by clause in the above table indicate as follows:
- Deletion : Deletes the specification items(s) or content(s) in International Standard.
  - Addition : Adds the specification item(s) or content(s) which are not included in International Standard.
  - Alteration : Alters the specification content(s) which are included in International Standard.
- NOTE 2 Symbol in column of overall degree of correspondence between **JIS** and International Standard in the above table indicates as follows:
- MOD : Modifies International Standard.

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